REMARKS

Applicant respectfully requests the Examiner to reconsider and again examine the claims in view of the following remarks.

Claims 1 to 41 are pending in the application. Claims 1 to 41 are rejected.

The Rejections under 35 U.S.C. §102(e)

The Examiner rejects Claims 1, 3, and 22 under 35 U.S.C. §102(e) as being anticipated by Madden et al. (U.S. Patent number 6,091,424).

Applicant submits that independent Claim 1 is patentably distinct over Madden et al., since the cited reference neither describes nor suggests "...a processor coupled to said display and operable to *identify at least a first cluster of overlapping labels* on said display, and operable to calculate new display coordinates for at least one label in said cluster and to move said label in accordance with said new display coordinates... ," as set forth in Claim 1.

It is well know that the problem of label placement is NP-hard (nondeterministic polynomial time-hard) and that an exhaustive search of optimal label placements can exceed time limits (especially for interactive applications) and/or available computational power, even for a limited number of graphical elements to be labeled and for a limited number of allowable label positions for each graphical element.

The present invention identifies labels on a computer display that lay on top of each other (i.e., at least one "cluster"), therefore restricting the number of labels to be processed, and is operable to move at least one overlapping label in a cluster to avoid the overlap. By reducing the number of repositionable labels to those in the at least one cluster of overlapping labels, calculation workload is reduced.

In contrast, Madden et al. teaches "[a] method for automated placement of labels for a given graph layout or map." (abstract) Like the present invention, Madden et al. attempts to simplify the NP-hard problem of label placements but in a fundamentally different way. Rather than identifying the claimed "cluster," Madden et al. uses as a starting point "the set Q of all potential label placements of graphical features." (see column 7, lines 31-35 and lines 39-43, and also Fig. 15). Madden neither identifies nor limits operation to the claimed clusters of overlapping labels.

Applicant submits that Madden et al. fails to teach the claimed cluster of overlapping labels. A cluster is described in the specification, for example, at page 16, lines 13-15 "... as a group of aircraft icons that transitively overlap each other, or alternatively as a group of aircraft icons and graphical object icons that overlap each other." Also, at page 17, lines 13-18 "...cluster lists may not include all of the visible aircraft. For example, if an aircraft does not overlap another aircraft or graphical object, and it itself is not overlapped by another aircraft or graphical object, then, in the present embodiment, it will not exist in a cluster and its label position will not be moved. This feature of the present embodiment allows the system to avoid moving labels that are not currently causing any problems, thus minimizing user distraction." Also, at page 10, lines 17-19 it is described that "...it is to be appreciated that the interchangeable use of the terms 'aircraft icon', 'icon' or 'aircraft', can mean a symbol representative of an aircraft and/or its label." Thus, a cluster is a group of graphical objects that overlap on a computer display, which can be icons and/or labels.

In contrast, Madden et al. describes clusters to be two-dimensional polygonal areas in a graph, which are not displayed on a computer display. For example, in describing Figures 6-6c, at column 10, lines 1-10, Madden states:

> "Given an input graph G, if the layout of G is planar (i.e., has no edge crossings), then the faces of that planar graph are the "clusters" of G. If the layout has crossings, then a planar graph Gclusters is constructed by introducing for each crossing a virtual node. The resulting graph is planar, and the faces of Gclusters are the clusters of G. FIG. 6(a) shows the layout of an original graph G. FIG. 6(b) shows a graph Gclusters which has been obtained from G by introducing virtual nodes, which are denoted by squares. Finally, in FIG. 6(c), the shaded regions are the clusters of G."

Figures 6a, 6b, and 6c show a constructed graph having Madden's clusters as crosshatched regions. There are seven different clusters in Figure 6c. Thus, clusters as used by Madden are merely regions on the graph.

Therefore, Applicant submits that the meaning of clusters as used by Madden is significantly different than used in the claimed invention. Madden's clusters are polygonal regions associated solely with objects on a graph, which is not displayed. In contrast, clusters of the present invention are associated with labels and/or icons, in particular labels and/or icons that are actually or transitively overlapping on a graphical display.

In accordance with the above discussion, Madden et al. fails to teach the claimed processor operable to identify at least a first cluster of overlapping labels on a display and to move at least one of the labels in accordance with new display coordinates in order to avoid the overlap.

In view of the above, Applicant submits that Claim 1 is patentably distinct over Madden et al.

For substantially the same reasons discussed above in conjunction with Claim 1, Applicant submits that independent Claim 3 is patentably distinct over Madden et al., since the cited reference neither describes nor suggests "...means for identifying at least a first cluster of overlapping labels; means for calculating new display coordinates for at least one label in said cluster; and means for moving said label in accordance with said new display coordinates," as set forth in Claim 3.

For substantially the same reasons discussed above in conjunction with Claim 1, Applicant submits that independent Claim 22 is patentably distinct over Madden et al., since the cited reference neither describes nor suggests "...identifying at least a first cluster of overlapping labels and graphical elements; calculating new display coordinates for at least one label in said

cluster; and moving said label in accordance with said new display coordinates," as set forth in Claim 22.

In view of the above, Applicant submits that the rejection of Claims 1, 3, and 22 under 35 U.S.C. §102(e) should be removed.

The Rejections under 35 U.S.C. §103(a)

Madden et al. in View of Syeda-Mahmood and Roy

The Examiner rejects Claims 2, 4-5, 8-9, 13-14, 17, 20, 23-24, 27, 32-33, 36, 39, and 41 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Syeda-Mahmood (U.S. Patent number 6,507,838) and Roy (U.S. Patent number 6,295,517).

With regard to independent Claim 13, the Examiner asserts that Madden et al. discloses an apparatus for positioning labels among graphical elements on a computer display, comprising means for sequentially selecting labels from a plurality of labels on the display. The Examiner recognizes that Madden et al. fails to disclose means for testing each of said selected labels for overlap with other labels and graphical elements in the display; means for accumulating an overlap score for each of said selected labels; means for generating a list of other labels and graphical elements that overlap each of said selected labels; means for comparing a plurality of said lists and accumulating cluster lists of overlapping labels and graphical elements; means for sorting a plurality of said cluster lists according to the number of entries in each; means for calculating new display coordinates for the labels on a cluster by cluster basis; means for comparing on a cluster by cluster basis, the degree of overlap of labels and graphical elements with said new display coordinates and the existing degree of overlap of labels and graphical elements, and if the new coordinates result in a reduction of the degree of overlap; means for moving the graphical elements to new positions according to said calculated display coordinates.

The Examiner relies upon Syeda-Mahmood to teach the claimed means for testing each of said selected labels for overlap with other labels and graphical elements in the display; means for accumulating an overlap score for each of said selected labels; means for generating a list of

other labels and graphical elements that overlap each of said selected labels; and means for comparing a plurality of said lists and accumulating cluster lists of overlapping labels and graphical elements. The Examiner concludes that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Syeda-Mahmood's label-positioning features into Madden... ."

The Examiner further relies on Roy to teach how clusters of data may be grouped into a graph, which may be topologically sorted (which would produce a sorting by the number of entries). The Examiner further concludes that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Roy's sorting capability into Madden's invention... ."

The Examiner further asserts that Madden et al. provides means for calculating new display coordinates for the labels on a cluster by cluster basis; means for comparing on a cluster by cluster basis the degree of overlap of labels and graphical elements with said new display coordinates and the existing degree of overlap of labels and graphical elements, and if the new coordinates result in a reduction of the degree of overlap.

Applicant submits that independent Claims 13 and 32 are patentably distinct over Madden et al., whether taken alone or in combination with Syeda-Mahmood and Roy, since the cited references neither describe nor suggest "... *sequentially selecting labels* from a plurality of labels on the display...testing *each of said selected labels* for overlap with other labels and graphical elements in the display...[and] calculating new display coordinates for the labels *on a cluster by cluster basis*... ," as set forth in independent Claims 13 and 32.

In contrast, as described above, Madden et al. uses as a starting point "the set Q of all potential label placements of graphical features." (see column 7, lines 31-35 and lines 39-43, and also Fig. 15). With this arrangement, Madden et al. operates on all of the potential label placements simultaneously as a group and evaluates the result with a cost function identified at column 5, line 64. Madden et al. describes at column 5, lines 60-61 that the problem is to "[f]ind

a labeling solution that minimizes the [cost function]... ." Madden et al. does not sequentially test labels for overlap as claimed and does not calculate new display coordinates on a cluster by cluster basis, but instead evaluates the above-mentioned cost function for all labels at the same time.

Furthermore, as described above, the Examiner relies upon Madden to teach the claimed calculating new display coordinates for the labels on a cluster by cluster basis, comparing on a cluster by cluster basis, the degree of overlap of labels and graphical elements with said new display coordinates and the existing degree of overlap of labels and graphical elements, and if the new coordinates result in a reduction of the degree of overlap, moving the graphical elements to new positions according to said calculated display coordinates. Applicant submits that Madden does not *move* graphical elements as claimed. Rather, Madden begins with a set of all possible label placements in a matching graph, which is not displayed, and statically selects from the set of all possible label placements to provide label placements on an overlap graph, which is also not displayed, to arrive at label positions for a displayed graph.

Applicant also submits, as discussed above, that the meaning of clusters as used by Madden et al. is significantly different than used in the claimed invention. Madden's clusters are polygonal regions associated solely with objects on a graph, which is not displayed. In contrast, clusters of the present invention are associated with labels and/or icons, in particular labels and/or icons that are actually or transitively overlapping on a graphical display.

Applicant submits that Syeda-Mahmood fails to overcome the above deficiencies in Madden et al. and also fails to teach the additional claimed features that the Examiner attributes to its teaching. Syeda-Mahmood describes a method and system for searching multimedia data, which does not include the claimed overlapping labels on a computer display. Furthermore, the Examiner refers to column 2, lines 1-17 of Syeda-Mahmood as describing the claimed testing each of said selected labels for overlap with other labels, accumulating an overlap score, generating a list of other labels and graphical elements, and comparing a plurality of said lists and accumulating cluster lists. According to Syeda-Mahmood at column 2, lines 1-17,

> "A method of searching multi-media data having different modes using a query, the method including processing the multi-media data to extract relevance scores and time reference points of matches to individual media modes, identifying overlapping time periods when two or more of the modal matches correspond to the query, and ranking a relevance of the overlapping time periods. The ranking includes finding an overlapping time period having a highest relevance score, segmenting the overlapping time period to identify beginning and ending events, calculating a relevance distribution based on a frequency of occurrence of the query in a time period, and finding a largest number of different modes of overlap. The modes include two or more of audio, video, text, and graphic display. The query can have an input mode based on any of the modes and the method further includes outputting results of the query in a mode consistent with the input mode."

Contrary to the Examiner's above assertions, Applicant cannot find the claimed testing each of said selected labels for overlap with other labels, accumulating an overlap score, generating a list of other labels and graphical elements, or comparing a plurality of said lists and accumulating cluster lists in Syeda-Mahmood. In contrast, Syeda-Mahmood describes searching multimedia data for overlapping time periods and assigning a relevance score associated with the time overlap.

Applicant submits that Roy also fails to overcome the above deficiencies in Madden et al. and also fails to teach the additional claimed features that the Examiner attributes to its teaching. Roy describes a simulation architecture and method (Abstract), which does not include the claimed overlapping labels on a computer display. Furthermore, the Examiner relies on column 8, lines 35-48 of Roy as teaching the claimed sorting a plurality of said cluster lists, which states:

> "As part of Default Clustering 104, once the initial clusters are identified, a topological sort of the cluster graph is performed in order to assign a level number to each cluster. Levelization is accomplished as follows. Clusters with primary inputs are assigned a level of zero. Any other cluster is assigned a level one higher than the maximum level of any cluster driving one of its inputs. For each clock cycle of a clock line, all clusters having that clock line, regardless of whether the cluster is oblivious-triggered cycle-based or event-triggered cycle-based, are evaluated in ascending levelization order. Levelization is performed purely for efficiency purposes. It ensures that a cluster is evaluated only once after all of the inputs which might affect that particular evaluation have changed."

The claimed "cluster," as noted above, is described, for example, at page 16, lines 13-14 to be "... a group of aircraft icons that transitively overlap each other, or alternatively as a group of aircraft icons and graphical object icons that overlap each other." Contrary to the Examiner's assertions, Applicant cannot find the claimed sorting a plurality of said cluster lists in Roy. Roy describes a cluster to be "... a region of the circuit which has uniform simulation activity," (abstract) not a group of graphical objects on a computer display as in the present invention.

In view of the above, Applicant submits that Claims 13 and 32 are patentably distinct over the cited references.

Claim 2 depends from and thus includes the limitations of independent Claim 1. Claims 4-5, and 8-9 depend from and thus include the limitations of independent Claim 3. Claims 14, 17, and 20 depend from and thus include the limitations of independent Claim 13. Claims 23-24 and 27 depend from and thus include the limitations of independent Claim 22. Claims 33, 36, 39, and 41 depend from and thus include the limitations of independent Claim 32. Thus, Applicant submits that Claims 2, 4-5, 8-9, 13-14, 17, 20, 23-24, 27, 32-33, 36, 39, and 41 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with independent Claims 1, 3, 13, 22, and 32. Accordingly, Applicant submits that the rejection of Claims 2, 4-5, 8-9, 13-14, 17, 20, 23-24, 27, 32-33, 36, 39, and 41 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Syeda-Mahmood, Roy, and Sagawa et al.

The Examiner rejects Claims 6-7 and 25-26 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Syeda-Mahmood, further in view of Roy, and further in view of Sagawa et al. (U.S. Patent number 5,963,731).

Claims 6-7 depend from and thus include the limitations of independent Claim 3. Claims 25 and 26 depend from and thus include the limitations of independent Claim 22. Thus, Applicant submits that Claims 6-7 and 25-26 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with independent Claims 3 and 22.

Accordingly, Applicant submits that the rejection of Claims 6-7 and 25-26 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Deering

The Examiner rejects Claims 10 and 29 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Deering (U.S. Patent number 6,525,723).

Claim 10 depends from and thus includes the limitations of independent Claim 3. Claim 29 depends from and thus includes the limitations of independent Claim 22. Thus, Applicant submits that Claims 10 and 29 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with independent Claims 3 and 22. Accordingly, Applicant submits that the rejection of Claims 10 and 29 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Prakriya et al.

The Examiner rejects Claims 11 and 30 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Prakriya et al. (U.S. Patent number 6,154,220). As an initial matter, Applicant notes that the U.S. Patent number for Prakriya et al. provided by the Examiner appears to be incorrect, and is correctly indicated above.

Claim 11 depends from and thus includes the limitations of independent Claim 3. Claim 30 depends from and thus includes the limitations of independent Claim 22. Thus, Applicant submits that Claims 11 and 30 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with independent Claims 3 and 22. Accordingly, Applicant submits that the rejection of Claims 11 and 30 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Higgins et al.

The Examiner rejects Claims 12 and 31 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Higgins et al. (U.S. Patent number 5,307,455).

Claim 12 depends from and thus includes the limitations of independent Claim 3. Claim 31 depends from and thus includes the limitations of independent Claim 22. Thus, Applicant submits that Claims 12 and 31 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with independent Claims 3 and 22. Accordingly, Applicant submits that the rejection of Claims 12 and 31 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Syeda-Mahmood and Roy

The Examiner rejects Claims 15-16 and 34-35 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Syeda-Mahmood and further in view of Roy.

Claims 15-16 depend from and thus include the limitations of independent Claim 13. Claims 34-35 depend from and thus include the limitations of independent Claim 32. Thus, Applicant submits that Claims 15-16 and 34-35 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with independent Claims 13 and 32.

Accordingly, Applicant submits that the rejection of Claims 15-16 and 34-35 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Syeda-Mahmood, Roy, and Deering

The Examiner rejects Claims 18 and 37 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Syeda-Mahmood, further in view of Roy, and further in view of Deering.

Claim 18 depends from and thus includes the limitations of independent Claim 13. Claim 37 depends from and thus includes the limitations of independent Claim 32. Thus, Applicant submits that Claims 18 and 37 are patentably distinct over the cited references generally for the reasons discussed above in conjunction with independent Claims 13 and 32. Accordingly,

Applicant submits that the rejection of Claims 18 and 37 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Syeda-Mahmood, Roy, and Prakriya et al.

The Examiner rejects Claims 19 and 38 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Syeda-Mahmood, further in view of Roy, and further in view of Prakriya et al.

Claim 19 depends from and thus includes the limitations of Claim 13. Claim 38 depends from and thus includes the limitations of Claim 32. Thus, Applicant submits that Claims 19 and 38 are patentably distinct over the cited references generally for the reasons discussed above in conjunction with independent Claims 13 and 32. Accordingly, Applicant submits that the rejection of Claims 19 and 38 under 35 U.S.C. §103(a) should be removed.

Madden et al. in View of Syeda-Mahmood, Roy, and Higgins et al.

The Examiner rejects Claims 21 and 40 under 35 U.S.C. §103(a) as being unpatentable over Madden et al. in view of Syeda-Mahmood, further in view of Roy, and further in view of Higgins et al.

Claim 21 depends from and thus includes the limitations of independent Claim 13. Claim 40 depends from and thus includes the limitations of independent Claim 32. Thus, Applicant submits that Claims 21 and 40 are patentably distinct over the cited references generally for the reasons discussed above in conjunction with independent Claims 13 and 32. Accordingly, Applicant submits that the rejection of Claims 21 and 40 under 35 U.S.C. §103(a) should be removed.

In View of Madden et al.

The Examiner rejects Claim 28 under 35 U.S.C. §103(a) as being unpatentable over Madden et al.

Claim 28 depends from and thus includes the limitations of independent Claim 22. Thus, Applicant submits that Claims 28 is patentably distinct over the cited reference generally for the reasons discussed above in conjunction with independent Claim 22. Accordingly, Applicant submits that the rejection of Claim 28 under 35 U.S.C. §103(a) should be removed.

In view of the above, Applicant submits that Claims 1-41 and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Response or this application.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845.

Respectfully submitted,

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